



## MM5832, MM5833 chromatic frequency generator

### general description

The National Semiconductor MM5832, MM5833 chromatic frequency generator is an MOS/LSI frequency synthesizer designed to generate musical frequencies. The circuits provide thirteen semi-tone outputs, fully spanning the equal tempered octave. The divisors have been carefully selected to offer excellent tuning accuracy. Output characteristics are fully compatible with the MM5554, MM5823 and MM5824 Frequency Dividers. The MM5832 or MM5833 is packaged in a 14-lead dual-in-line package.

- 7 kHz to 2.1 MHz input frequency
- Maximum error of 1.16 cent

### applications

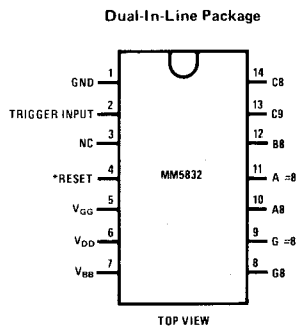
- Celeste tone generator
- Electronic music synthesizers
- Organ tone generators
- Chorus tone generators

### features

- Single-phase squarewave input

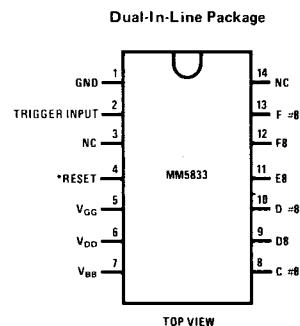
3

### connection diagrams



Order Number MM5832N  
See Package 18

\*Used only for testing. Pin 4 is normally grounded.



Order Number MM5833N  
See Package 18

## absolute maximum ratings

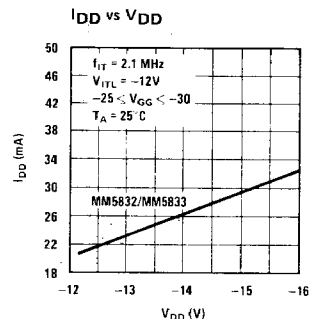
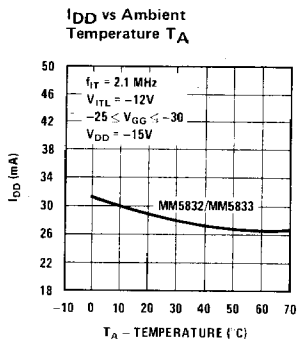
Clock Generator Voltage ( $V_{GG}$ )	$V_{SS} + 0.3V$ to $V_{SS} - 33V$
Logic Supply Voltage ( $V_{DD}$ )	$V_{SS} + 0.3V$ to $V_{SS} - 25V$
Buffer Supply Voltage ( $V_{BB}$ )	$V_{SS} + 0.3V$ to $V_{SS} - 18V$
Trigger Input Voltage ( $V_{IT}$ )	$V_{SS} + 0.3V$ to $V_{SS} - 18V$
Power Dissipation ( $P_D$ )	800 mW
Storage Temperature ( $T_S$ )	$-55^{\circ}C$ to $+100^{\circ}C$
Operating Temperature ( $T_A$ )	$0^{\circ}C$ to $+70^{\circ}C$

## electrical characteristics

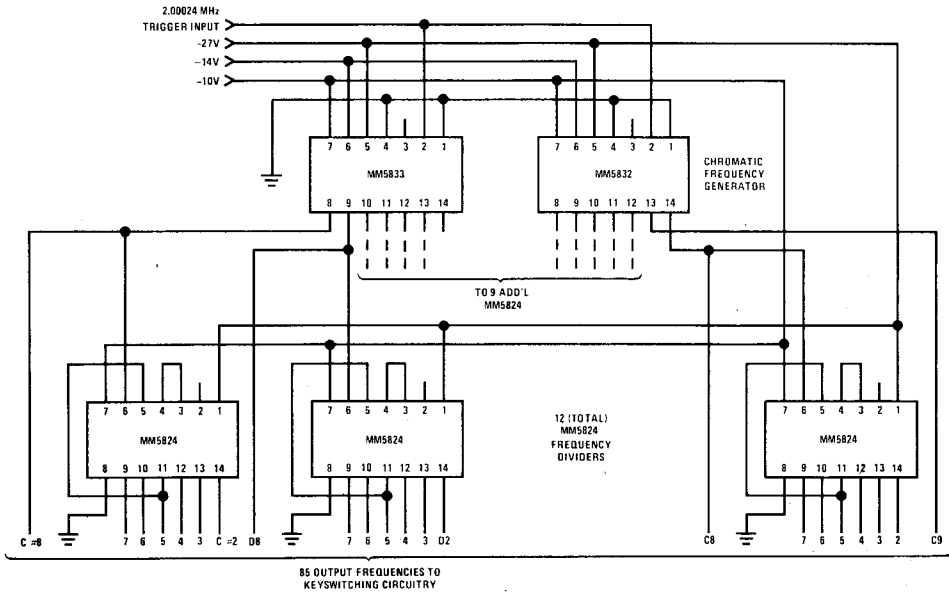
$T_A$  within operating range ( $V_{GG} = -27V \pm 2V$ ,  $V_{DD} = -14V \pm 1V$ ,  $V_{BB} = -10V \pm 0.5V$ ,  $V_{SS} = 0V$ ), unless otherwise noted.

PARAMETER	MIN	TYP	MAX	UNITS
Trigger Input				
Frequency ( $f_{IT}$ )	7.0	2000.24	2100	kHz
Capacitance ( $C_{IT}$ )			7.0	pF/pkg
Rise and Fall Times ( $t_r$ , $t_f$ ) (10% to 90% at 2.1 MHz)			30	ns
Pulse Width (at $-5.0V$ ) ( $p_w$ )	0.4T		0.6T	( $T = 1/f_{IT}$ )
Logical High Level ( $V_{ITH}$ )	+0.3	0	-2.0	V
Logical Low Level ( $V_{ITL}$ )	-16		-8.0	V
Leakage Current ( $I_{ITL}$ )			1.0	$\mu A$
Buffer Outputs: (loaded $20\text{ k}\Omega$ to ground and $20\text{ k}\Omega$ to $V_{BB}$ , $T_A = 25^{\circ}C$ )				
Logical High Level ( $V_{OH}$ )	-2.0		0	V
Logical Low Level ( $V_{OL}$ )	$V_{BB}$		-8.0	V
C8 Duty Cycle		50		%
C #8 thru C9 Duty Cycle		30		%
Supply Currents: (no output loads, $T_A = 25^{\circ}C$ )				
Clock Generator Supply ( $I_{GG}$ )	1.5		3.5	mA
Logic Supply ( $I_{DD}$ )	16		34	mA
Buffer Supply ( $I_{BB}$ )			25	$\mu A$

## typical performance characteristics



## typical application



Typical Organ Tone Generator

## output details (2.00024 MHz input)

MM5832

NOTE	DIVISOR	OUTPUT FREQUENCY	E.T.S. FREQUENCY	CENT. ERROR
C8	478	4184.61	4186.01	-0.565
C9	239	8369.21	8372.02	-0.565
B8	253	7906.09	7902.13	0.842
A #8	268	7463.58	7458.62	1.119
A8	284	7043.10	7040.00	0.740
G #8	301	6645.32	6644.88	0.112
G8	319	6270.34	6271.93	-0.424

MM5833

NOTE	DIVISOR	OUTPUT FREQUENCY	E.T.S. FREQUENCY	CENT. ERROR
F #8	338	5917.87	5919.91	-0.580
F8	358	5587.26	5587.65	-0.117
E8	379	5277.68	5274.04	1.160
D #8	402	4975.72	4978.03	-0.780
D8	426	4695.40	4698.64	-1.159
C #8	451	4435.12	4434.92	0.076